UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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JUN 19 2017

OFFICE OF
WATER AND WATERSHEDS

Mr. Barry Thom
Regional Administrator
National Marine Fisheries Service
West Coast Region
7600 Sand Point Way NE, Bldg. 1
Seattle, WA 98115

Re: Essential Fish Habitat (EFH) Response for the Issuance of a National Pollutant Discharge Elimination System (NPDES) General Permit for Offshore Seafood Processors Discharging
in Federal Waters of the Washington and Oregon Coast (Permit No. WAG520000)

NMFS No. WRC 2015-3556

Dear Mr. Thom:

Under the Magnuson-Stevens Fishery Conservation and Management Act, NMFS and various fisheries management councils must identify and protect "essential fish habitat" (EFH) for species managed under the Act. The EFH regulations define an "adverse effect" as any impact that reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species fecundity), site-specific, or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions. Agency actions that may adversely affect EFH requires consultation with the NMFS.

The EPA submitted a Biological Evaluation (BE) dated August 2015 to the NMFS. The EPA's EFH assessment is included as Appendix A to the BE, and concluded that the discharges authorized by the draft General Permit will not adversely affect EFH. On December 18, 2015, the NMFS communicated to the EPA that the proposed action could adversely affect EFH because of impacts to water quality (via pollutant loading and decreased dissolved oxygen) and to benthic conditions (because of laying of discharged fish processing waste on the sea floor). The NMFS provided conservation recommendations to avoid, mitigate, or offset the impact of the proposed action on EFH. The EPA's responses to those recommendations are provided below, in accordance with 50 CFR 600.920(1).

The EPA is re-proposing the General Permit in order to address issues highlighted during the public comment period and in the course of the EPA's various consultations. The re-proposed General Permit and revised Fact Sheet are enclosed as attachments to this letter. In order to address comments and recommendations from the NMFS and from other agencies, the EPA has revised the BE to reflect additional research and proposed permit conditions. The revised BE is also enclosed as an attachment to this letter.

NMFS Recommendation 1: To minimize water quality impacts from nutrient loading that spurs algal growth, no discharge shall occur in or within 250 feet of a visible algal bloom.

EPA Response 1: During the course of EFH consultation with the NMFS regarding how this conservation recommendation could be implemented via the NPDES General Permit, it became clear that the conservation recommendation was primarily concerned with harmful algal blooms (HABs), as opposed to algal blooms in general (Shorin and Trainer, 2016, via personal communications). Thus, the EPA has focused its response on harmful algal blooms.

Algal blooms are common in aquatic environments. A subcategory of these blooms poses environmental or public health risk, and are therefore referred to as "harmful algal blooms," or HABs. Some HABs are deleterious because of their sheer biomass, whereas others are associated with algal blooms capable of producing toxins (e.g. the neurotoxin domoic acid). During a HAB event, algal toxins can bioaccumulate up the food web. Animals, including humans, can be exposed to HAB-related toxins when they eat contaminated fish or shellfish, have contact with contaminated water, or inhale contaminated aerosols (Backer and McGillicuddy, 2006).

Harmful algal blooms can cause a number of human health effects, including paralytic shellfish poisoning, neurotoxic shellfish poisoning, and respiratory irritation, diarrhetic shellfish, poisoning, amnesic shellfish poisoning, and cyanobacterial toxin illnesses (Backer and McGillicuddy, 2006). The neurotoxin domoic acid has impacted numerous species along the West Coast since 1991, including razor clams, Dungeness crabs, seabirds, and marine mammals (Trainer et al., 2002). Domoic acid can bioaccumulate via food web transfer from filter-feeding fish and shellfish to birds and mammals (Trainer, et al., 2002).

The Juan de Fuca Eddy (which is located off the Northwest corner of Washington State, in federal waters to be covered by this General Permit) is thought to be an initiation site for toxic Pseudo-nitzschia blooms, which can impact the Washington coast (MacFadyen et al., 2008; Trainer, et al., 2002). The Juan de Fuca eddy region is characterized by high phytoplankton biomass (Trainer, et al., 2002). The eddy is seasonal and topographically defined, with typical near-surface eddy radii ranging from ~15 km in the early summer to ~30 km in September (MacFadyen et al., 2008). According to MacFadyen et al. (2008), "The presence of the eddy facilitates large inputs of dissolved inorganic nutrients to the area and thus has a major impact on regional nutrient distributions. Nutrients are supplied to the region through two primary mechanisms: direct upwelling of California Undercurrent water onto the shelf, and enhanced cross-shelf advection of Juan de Fuca Strait outflow. The penetration of Undercurrent source water to increasingly shallow depths throughout the season results in elevated nutrient concentrations over a large portion of the northern Washington shelf."

Algal blooms can be difficult to identify. HABS have been called "red tides" because many were comprised of red pigmented dinoflagellates, but blooms can also be yellow, green, or brown, depending on the type of algae present (Glibert, et al., 2005). But algal blooms are not always visible. According to Zingone and Enevoldsen (2000), the microalgal species that are potentially involved in HABs comprise approximately 80 toxic species and 200 noxious species out of about 4,000 total marine planktonic microalgae that had been described to date. Less than one percent of algal blooms actually produce toxins (NOAA, 2016) and only a handful of Pseudo-nitzschia produce domoic acid. At present, monitoring for the specific domoic acid-producing diatoms provides the only proactive method that permits some early warning that shellfish might become

become toxic. Unfortunately, *P. multiseries*, which produces the toxin and *P. pungens* (which does not produce significant amounts of the toxin) are virtually identical under the standard light microscope. Therefore, a current means to identify the toxic species from non-toxic is by the scanning electron microscope (SEM), a method that magnifies cells about 20,000 times (Northwest Fisheries Science Center, 2008). To further complicate matters, there are many places where HAB monitoring and surveillance programs do not exist.

Given the challenges associated with addressing harmful algal blooms, as part of this EFH consultation, the EPA sought the expertise of Dr. Vera Trainer, a NOAA scientist whose research is focused on West Coast harmful algal blooms. Since the EPA was working to address not only the NMFS EFH concerns regarding algal blooms, but also those of the NOAA Olympic Coast National Marine Sanctuary (with which the EPA was engaged in a concurrent but separate consultation), the EPA requested that NOAA provide the EPA permit writer with concrete recommendations for implementation in the NPDES permit. On May 31, 2016, NOAA provided the EPA with a potential bounding box for the Juan De Fuca Eddy (Trainer, 2016, personal communication). See Figure 1. The EPA considered prohibiting discharge within the Juan de Fuca Eddy region, but decided against it, in part because of impacts to tribal treaty protected fisheries within a tribe's usual and accustomed fishing area.

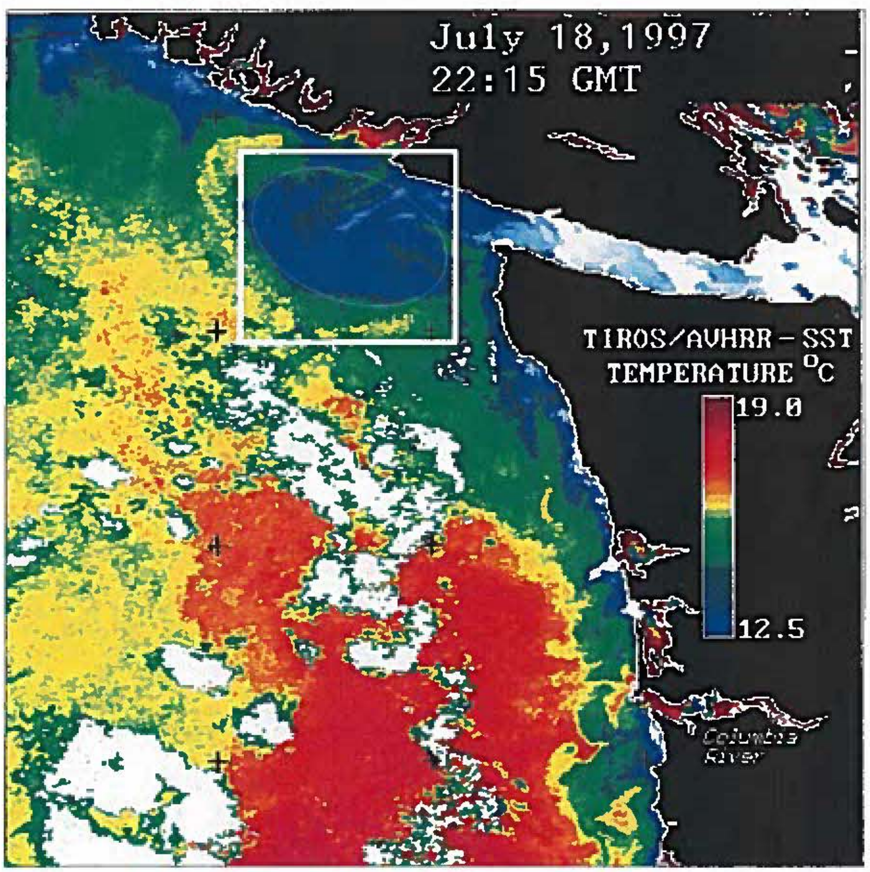

Figure 1. Satellite-derived sea surface temperature (SST), particulate domoic acid (µg/L) and total Pseudo-nitzschia cell numbers in surface seawater July 1997 (modified from Trainer et al., 2002). This image (including a potential bounding box for the Juan De Fuca Eddy) was provided

to the EPA as part of the EFH consultation on May 31, 2016 (Trainer, 2016, personal communication).

On July 14, 2016, Dr. Trainer communicated the following to the EPA via email:

"...[T]he following are scientific facts regarding harmful algal blooms (HABs) in the area:
1. The seasonally retentive Juan de Fuca eddy is a hotspot for harmful algal bloom initiation off the Washington State coast.
2. The manifestation of the eddy varies considerably and basically disappears during the winter
3. Pseudo-nitzschia (one of the harmful algal species) abundance and toxin production are influenced by nutrient (pulses of nitrate, ammonium) inputs in the coastal environment. These cells bloom when pulses of nutrients are supplied, especially after periods of nutrient limitation.

These 3 facts are our basic truths that need to be connected with more scientific research. There currently is no evidence to suggest that nutrient inputs from fish processing will be sufficient to cause toxic algal blooms.

I suggest the following.

That this wish for proper permitting be based on strong science and scientific collaboration. For example, the current project on Monitoring and Event Response to HABs (MERHAB) project that proposes to collaborate with the Makah and makes available boat sampling in the Makah U&A, provides an opportunity to sample inside and outside the eddy region, both near and far to the fish processing vessels. I would recommend that phytoplankton net tows, whole water and nutrient samples be collected near the vessels before and after discharge. In fact, the fish processing vessels could be involved in the sample collection, as the work is very simple and straightforward.

I would imagine that similar samples could be collected to answer questions about hypoxia and perhaps also pH.

I would strongly advocate for a delay in issuance of the permit until the proper science is available to substantiate any decisions."

Since the NOAA scientist to whom the NMFS was deferring for this EFH conservation recommendation states that there is currently no evidence to suggest that nutrient inputs from fish processing will be sufficient to cause toxic algal blooms, it would not be reasonable for the EPA to prohibit seafood processing waste discharge within the bounding box in Figure 1. In addition, the Makah Tribe has communicated to the EPA that prohibiting discharge within the Juan de Fuca eddy would negatively impact its treaty protected fisheries.

The Juan de Fuca eddy is not the only known HAB hotspot on the West Coast; Heceta Bank is also a HAB hotspot (Trainer, 2016, personal communication). As explained in more detail in responses 2 and 3, below, the EPA proposes to prohibit discharge year-round over the Heceta/Stonewall Banks complex off the coast of Newport, Oregon. See Figure 3.

With regard to monitoring for HABs, the EPA is supportive of additional scientific research on West Coast HABs, but believes that a requirement for permittees to participate in the Monitoring and Event Response to HABs (MERHAB) project is beyond the scope of this NPDES permit. Conducting phytoplankton net tows and sampling for whole water and nutrients before and after discharge are also beyond the scope of this permit, and/or infeasible because vessels are moving while discharging. If permittees are interested in collaborating with NOAA to further the scientific knowledge on HABs, the EPA encourages those permittees to contact NOAA directly.

NPDES permits are written for a 5-year time period; the EPA will consider any relevant/new information when this permit is reissued.

NMFS Recommendation 2: *To minimize impacts to Habitat Areas of Particular Concern, no discharge shall occur over or within 250 feet of rocky reefs.*

EPA Response 2: In order to map rocky reefs, the EPA referred to the "“V4_0_SGH_WA_OR_NCA” GIS layer (see Goldfinger et al., 2014).

Rocky reef substrate encompasses a large area off the coast, including many popular fishing locations (see Figure 2). It would be unreasonable for the EPA to prohibit discharge within 250 feet of all of rocky reef substrate.

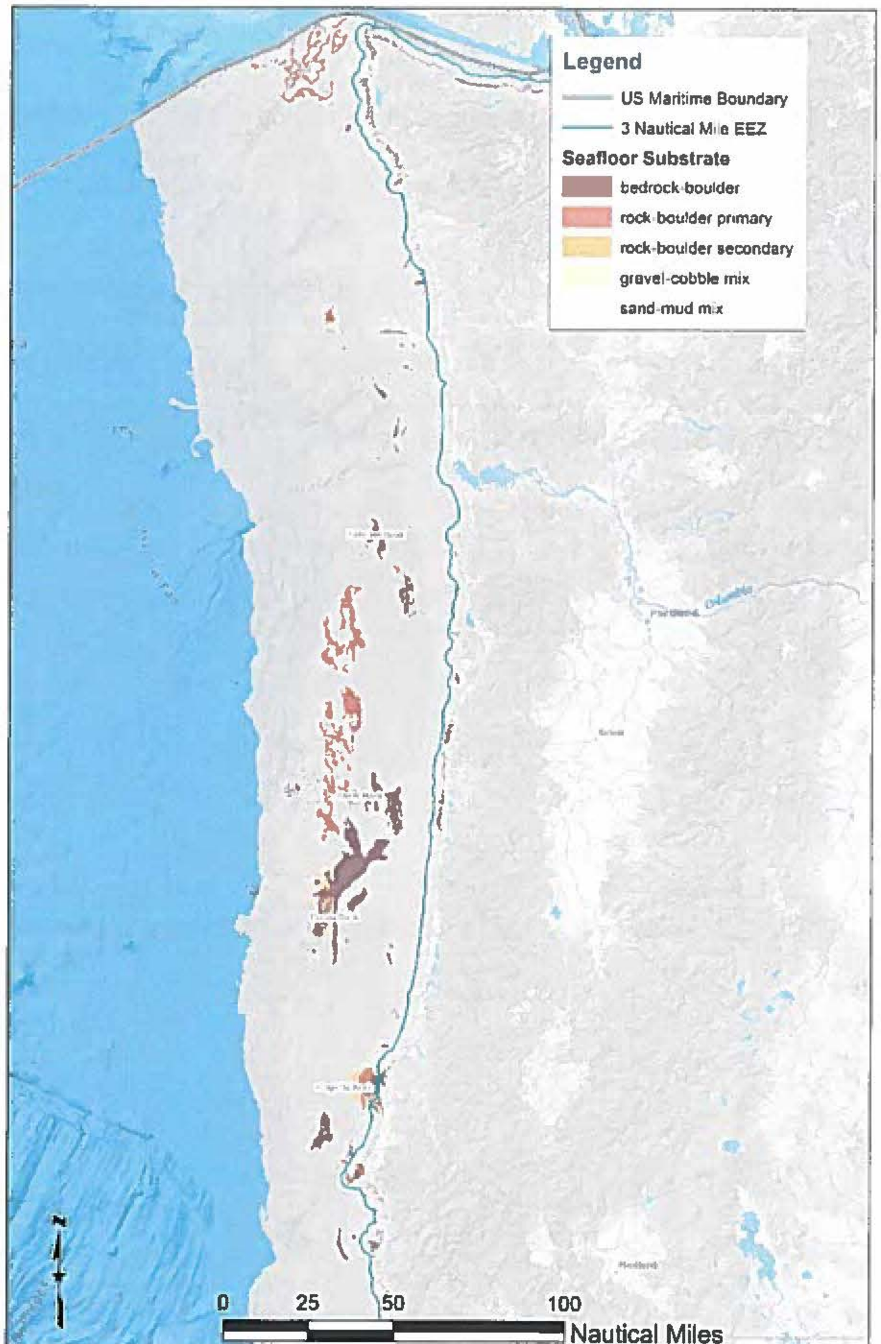

Figure 2. Rocky Reef Substrate. Source: "V4_0_SGH_WA_OR_NCA" (Goldfinger, et al., 2014).

However, the EPA is proposing to prohibit discharge year-round within the Heceta/Stonewall Banks rocky reef complex, and during April 15 – October 15 in waters shallower than 100 meters. See Figure 3, below, and Sections III.B.4 and III.B.5 of the re-proposed draft General Permit. See the revised BE and the re-proposed Fact Sheet for more detail on how the EPA is addressing ecologically sensitive rocky reefs in this General Permit.

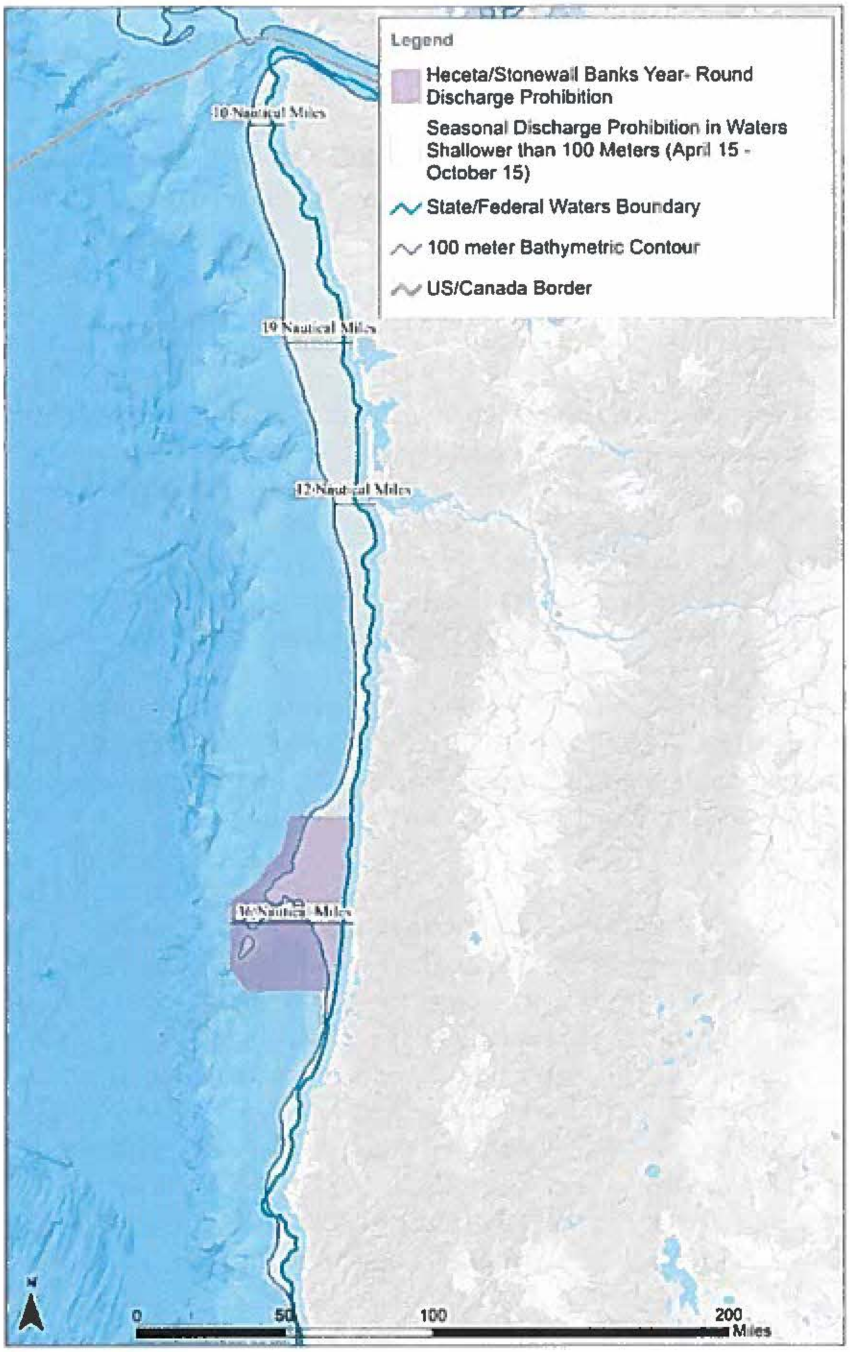

Figure 3. Proposed discharge prohibitions, including the Heceta/Stonewall Banks rocky reef complex.

NMFS Recommendation 3: *To minimize water quality impacts from nutrient loading that increase demand for dissolved oxygen, no discharge shall occur in or within 250 feet of an identified hypoxic zone.*

EPA Response 3: The dynamics of seasonal hypoxia off the Washington and Oregon coast are well described by Peterson, et al. (2013): "In the northern section of the California Current (NCC), running along the west coast of the U.S.A., seasonal hypoxia events are driven by a combination of relatively low oxygen waters upwelling onto the shelf with further oxygen drawdown stemming from the decomposition of organic matter settling to the seafloor (Chan et al., 2008; Connolly et al., 2010). During the upwelling season (typically mid-April to mid-October), water from 100–150 m depth is transported up onto the shelf and replaces surface waters that move offshore via wind-driven Ekman transport. The upwelled waters are relatively old and tend to be low in oxygen due to extended exposure to water column respiration and isolation from the atmosphere."

Although high primary production [from nutrient inputs] produces oxygen at the surface, the system is driven toward hypoxia when the particulate organic carbon sinks and respires into water already low in oxygen (Siedlecki, et al., 2015). Seafood processing waste not consumed at the surface has high biochemical oxygen demand, and could contribute to near-bottom hypoxia off the coast, particularly in wide shelf areas that already experience high sediment oxygen demand. Even if dissolved oxygen has already reached hypoxic levels at the continental shelf break, respiration can further exacerbate hypoxic conditions as bottom water moves shoreward over the shelf, especially if surface organic carbon sources are sizable (Grantham, et al., 2004). Once nutrients sink to the bottom off the Washington and Oregon coast, they stay on the shelf until circulation patterns are strong enough to flush them away (Siedlecki, et al., 2015).

Oceanographers whom EPA interviewed while developing this draft permit recommended depth-based discharge exclusion zones in waters shallower than 100 or 200 meters in depth to prevent seafood waste discharges from triggering or exacerbating hypoxic conditions in retentive and/or wide continental shelf areas (Newton and Peterson, 2016, via separate personal communications).

The width of the shallow shelf is the critical factor that controls sediment oxygen demand, probably because proximity of the bottom to the surface allows organic matter to reach the bottom, and sediment oxygen demand is directly proportional to the flux of detritus that sinks to the seafloor (Siedlecki, et al., 2015). Observations of sediment oxygen demand in waters shallower than 70 meters are not available, but biomass is more concentrated near the coast, resulting in more large detrital particles (Siedlecki, et al., 2015). Seafloor oxygen modeling for waters off the Washington and Oregon coasts shows substantial depth dependence, with more sediment oxygen demand in the shallower depths. The larger detritus tends to sink faster, so it reaches the seafloor and respires faster. Generally, more detritus reaches the bed faster in shallower water columns, since there is less area for respiration to occur in the water column (Siedlecki, et al., 2015).

The Heceta and Stonewall Bank complex and coastal circulation off central Oregon have been well studied. The central Oregon coast has complex bathymetry; the shelf width increases by a factor of five in 150 km alongshore, and submarine banks are present over the shelf (Kosro 2005). Small eddies and interactions with topography modify the currents over Heceta Bank (Kosro, 2005). For a description of the spatial structure of the temperature, salinity, density, and velocity fields during upwelling between the region north of Newport and over Heceta Bank, see Castelao and Barth (2005). It is likely that respiration of enhanced plankton biomass has contributed to hypoxic waters near the bottom in the Heceta Bank area (Wheeler, et al., 2002). According to Barth, et al. (2005), the sinking of organic matter over the Heceta Bank complex, and the subsequent respiration, is probably an important factor in the low-oxygen bottom waters observed there. The Heceta and Stonewall Bank system is also stressed by ocean acidification.

Oceanographers interviewed by EPA specifically recommended excluding discharge in the Heceta and Stonewall Bank complex, especially in the quiescent zone where currents are sluggish, and where near-bottom hypoxia is frequently observed during the summer months (Barth, Chan, and Peterson, via separate personal communications, 2016).

In order to avoid triggering or exacerbating hypoxic conditions because of additional nutrient inputs from seafood processing waste, the EPA proposes to prohibit the discharge of seafood processing waste in waters shallower than 100 meters in depth during April 15 – October 15. Heceta Bank and the broad Washington shelf region (e.g. offshore of Grays Harbor at 46 N–47 N) are known ''hot spots'' of organic matter respiration (Siedlecki, et al., 2015 and the references therein). A depth-based discharge exclusion zone will help to protect the wider shelf areas, where both detrital concentrations and sediment oxygen demand are high (Siedlecki, et al., 2015). The wide shelf areas off the Washington and Oregon coasts are already stressed by ocean acidification and hypoxia, both of which are projected to increase as the global climate continues to change.

This NPDES General Permit applies only to the discharge, and not to the act of harvesting seafood. Thus, the seasonal discharge prohibition would only apply to seafood processing waste discharged under this NPDES General Permit, and would not apply to the fishing action itself. Thus, vessels could still catch fish in waters shallower than 100 meters, but vessels would not be permitted to discharge seafood processing waste in waters less than 100 meters deep. Because hypoxia is a seasonal issue, the EPA is not proposing to prohibit discharge in shallower waters during the winter months. The seasonal discharge prohibition in waters shallower than 100 meters is shown in Figure 4, and has been added to the re-proposed General Permit Part III.B.4.

In addition to the seasonal, bathymetry-based discharge prohibition described above, the EPA proposes to prohibit discharge year-round over the Heceta/Stonewall Banks complex. Oceanographers interviewed by the EPA specifically recommended excluding discharge in the Heceta and Stonewall Banks complex, especially in the quiescent zone where currents are sluggish, and where near-bottom hypoxia is frequently observed during the summer months (Barth, Chan, and Peterson, via separate personal communications, 2016). In a December 9, 2016 letter to the EPA, the Oregon Department of Fish and Wildlife (ODFW) also recommended that the EPA prohibit discharge year-round over the Heceta/Stonewall Banks complex: "The areas of greatest concern for large-scale hypoxia are Stonewall Banks and Heceta Banks off central Oregon. Oceanographic processes, retention areas and circulation patterns originating in deep waters set up hypoxic conditions in adjacent shallower waters (approx. <100m). Sluggish circulation patterns are well documented at Stonewall Bank and Heceta Bank has year-round low oxygen levels. Scientists are concerned that discharge fish processing waste on and in the vicinity of the Heceta-Stonewall Banks Complex could trigger and/or exacerbate hypoxic conditions there and in shallow waters."

In light of the well-documented concern regarding hypoxic conditions in the Heceta/Stonewall Banks complex in particular, the EPA proposes to prohibit discharge year-round discharge above the Heceta/Stonewall Banks complex, as shown in Figure 3.

If a Permittee (or group of Permittees) is able to demonstrate that the discharge will not contribute to a measurable change in near-bottom oxygen levels, then that Permittee may be granted authorization to discharge in waters shallower than 100 meters during the summer upwelling season and/or in the Heceta/Stonewall Banks complex, subject to the Director's approval and in accordance with the requirements in Section V.B.7 of the re-proposed General Permit.

The EPA is also proposing to require additional reporting on the quantity and nature of the discharge in order to better understand potential impacts to water quality and dissolved oxygen (see Appendix A of the re-proposed General Permit for the revised NOI and Appendix B for the revised Annual Report). Proposed reporting requirements include: a table on which to report daily location of the vessel while discharging, minimum and average daily distances traveled, vessel speed, total stickwater discharged per month, maximum daily discharge amounts, and monthly average by-product recovery rates.

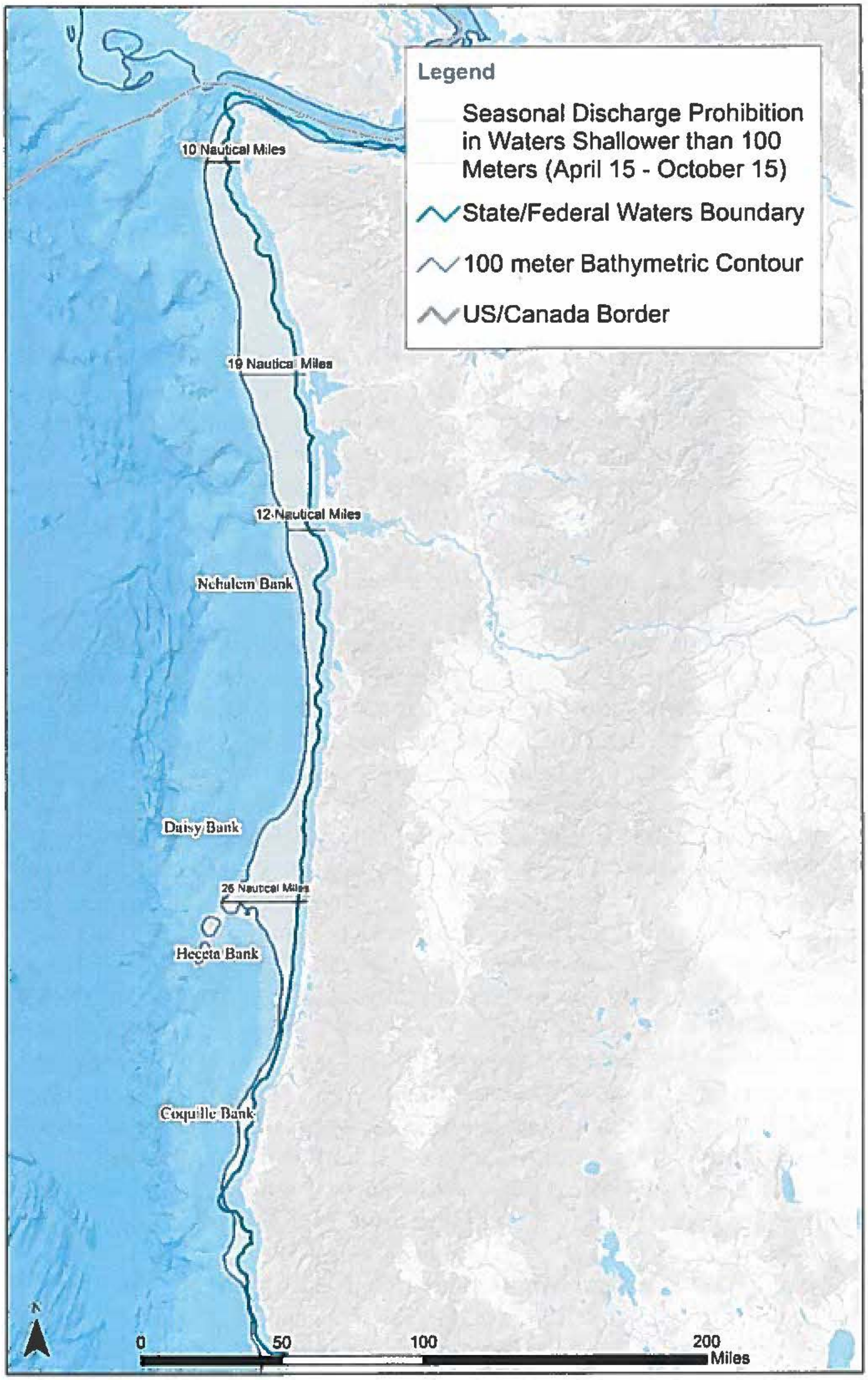

Figure 4. Proposed seasonal discharge prohibition in waters shallower than 100 meters in depth.

With regard to the EFH conservation recommendation, hypoxic conditions are primarily located at the seafloor, while the discharges occur at the surface. It would be infeasible to prohibit discharge within 250 feet of an identified hypoxic zone, since hypoxic zones are often not identified. The EPA believes that a seasonal discharge prohibition in shallow (<100 meter) waters and over the Heceta/Stonewall Banks complex is a more appropriate approach to avoid exacerbating hypoxic conditions via this NPDES General Permit.

NMFS Recommendation 4: *To ensure that dispersal of discharged material is sufficient to reduce impacts to both water quality and benthic conditions, vessels shall maintain, so long as safety permits, a minimum vessel speed of 5 knots during discharge to minimize density of effluent.*

EPA Response 4: As currently written, this conservation recommendation would be infeasible if incorporated as a permit requirement, and could compromise the safety of regulated vessels. The offshore seafood processing industry communicated to the EPA that although vessels are underway while discharging, it would be problematic to impose a minimum discharge speed of five knots because vessels typically conduct fishing activities at a speed lower than five knots. In February, 2017, Mike Hyde of American Seafood Company LLC discussed this issue with other operators and provided additional information to EPA, included below:

"[A] catcher processor is a vessel that catches and processes fish at the same time. Both operations generally continue concurrently 24 hours per day from arrival of the vessel on the fishing grounds until the vessel returns to port for offloading and re-supply. There are several factors that determine the speed of the vessel while it is operating but its speed while fishing is the most important. During fishing operations, the vessel has two main objectives: catching the target fish and not catching everything else. This is best achieved at towing speeds relative to the water of about 3.5 knots. The fishing nets on these vessels are very large and require significant horsepower to tow through the water. Our vessels use roughly 80% of their total power to tow just in ordinary fishing conditions. I don't believe that any of our vessels has sufficient horsepower to tow its net at speeds above 5 knots. Even if they had the power to tow at 5 knots, the result would be a disaster in terms of both catch rates and bycatch. The nets are not designed to be towed at those speeds and would likely be stretched completely out of fishing shape. For certain, the salmon excluders and other bycatch reduction devices in the nets would collapse and bycatch rates would increase dramatically. For motherships, because they are not towing fishing nets, there are times at which those vessels will exceed 5 knots but because a mothership is part of an integrated operation with several catcher vessels that are fishing at closer to 3 knots, the mothership would not be operating over a larger area; it would simply be moving faster within the same area. More importantly, because the mothership is taking transfers of codends from the catcher vessels, it must operate during this process at about 1 knot. Finally, in high sea conditions, a 5 knot speed requirement would disrupt processing for both catcher processors and motherships and would create increased safety risks for even routine onboard operations."

As described above, it would be infeasible to require a minimum vessel speed of 5 knots as part of this General Permit. In order to address the spirit of the NMFS's concerns, the EPA proposes to add a Best Management Practice (BMP) in the re-proposed General Permit that vessels must be moving while discharging (in order to aid dispersion), unless doing so would compromise the safety of the vessel. Due to feasibility and safety concerns from the seafood industry, the EPA has decided not to impose a specific minimum discharge speed in the General Permit.

Conclusion
The EPA appreciates the willingness of NOAA/NMFS staff and scientists to engage with the EPA to resolve these issues, and invites further input during the public comment period. If you have any questions or comments about this response to the NMFS conservation recommendations to protect EFH, please feel free to contact me directly, or contact Catherine Gockel of my staff at 206-553-0325 or by email at gockel.catherine@epa.gov.

Sincerely,

Christine Psyk

Christine Psyk, Acting Director
Office of Water and Watersheds

Enclosures: Draft General Permit, Re-proposal Fact Sheet, Revised Biological Evaluation

cc: Bonnie Shorin, NMFS *(via electronic transmission)*
Vera Trainer, NOAA *(via electronic transmission)*
Carol Bernthal, OCNMS *(via electronic transmission)*
George Galasso, OCNMS *(via electronic transmission)*

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